Patent claims

1. A method for culturing cells (2), the cells (2), for formation of a cell layer, being introduced into a cell culture chamber which is formed in the interior of a support structure (1), the support structure (1) corresponding in its shape and size at least approximately to the shape, such as an implant, or a prosthesis, to be formed by the cells (2), nutrients and/or oxygen being supplied to the support structure (1), and the support structure (1) being furnished externally with a boundary layer (4) which is impermeable to cells.

2. The method as claimed in claim 1, characterized in that the support structure (1) consists of a porous material which is permeable to cells (2).

3. The method as claimed in claim 1 or 2, characterized in that the support structure (1) is formed as place holder material which is removable or convertible by the cells (2).

4. The method as claimed in claim 3, characterized in that the support structure (1) has calcium phosphate.

5. The method as claimed in claim 2, characterized in that the support structure (1) is furnished with cells and nutrient solution at the start of culturing, after which the boundary layer (4) is applied.

6. The method as claimed in claim 1, characterized in that the boundary layer (4) is formed from a biological or synthetic material.

7. The method as claimed in claim 6, characterized in that the boundary layer (4) is formed from a hydrogel.

8. The method as claimed in claim 6, characterized in that the boundary layer (4) is formed from an alginate which is polymerized in a calcium chloride solution and, after formation of the cell layer, is removed again from the support structure (1) by a low-calcium solution.

9. The method as claimed in claim 6, characterized in that the boundary layer (4) is formed by an overgrowth with cells which form a membrane.

10. The method as claimed in claim 9, characterized in that the boundary layer (4) is formed by cartilage cells or fibroblasts, osteoblasts or chondrocytes.

11. The method as claimed in claim 1, characterized in that the boundary layer (4) is formed so as to be gas permeable.

12. The method as claimed in claim 1, characterized in that the boundary layer (4) is applied by spraying on a material which is impermeable to cells or by a dipping bath (3).

13. The method as claimed in claim 1, characterized in that, between the support structure (1) and the boundary layer (4), an intermediate layer is introduced which does not bond to the support structure (1).

14. The method as claimed in claim 13, characterized in that, as intermediate layer, there is introduced a lipid layer, glycoproteins, proteins or biodegradable or removable layers.

15. The method as claimed in claim 1, characterized in that a liquid or viscous polymer is used as intermediate layer (4).

16. The method as claimed in claim 1, characterized in that the support structure (1) is furnished with feeds and outlets (5, 6) for oxygen and/or nutrients.

17. The method as claimed in claim 1, characterized in that the boundary layer (4) is formed so as to be mechanically removable.

18. The method as claimed in claim 1, characterized in that the boundary layer (4) is formed so as to be detachable or soluble and/or is vascularized or prevascularized.

19. The method as claimed in claim 1, characterized in that a plurality of support structures (1) are introduced into a nutrient solution.

20. The method as claimed in one of claim 1 to 19, characterized in that the support structure (1) is exposed to pressure loads by a liquid or gaseous medium.

21. The method as claimed in claim 20, characterized in that at least one support structure (1) is inserted into a container (14) which is exposed to a changing gas or liquid pressure by a pressure medium (19).

22. The method as claimed in claim 20 or 21, characterized in that around the support structure (1) a protective film (20) is placed which forms a pressure chamber around the support structure (1), the protective film (20) being exposed to pressure loads on the side facing away from the support structure (1).

23. The method as claimed in one of claims 1 to 22, characterized in that the support structure (1) is incorporated into a nutrient circuit (11) and is bound to an oxygen carrier.

24. The method as claimed in claim 23, characterized in that a nutrient reservoir (13) is used in the circuit (11).

25. An apparatus for carrying out the method as claimed in one of claims 1 to 24, characterized in that the support structure (1) is furnished with feeds and outlets (5, 6) and is used in a container (14) which is furnished with feeds and outlets (15, 16).

26. The apparatus as claimed in claim 25, characterized in that the support structure (1) is inserted into a nutrient circuit (11).

27. The apparatus as claimed in claim 25, characterized in that the support structure (1) corresponds in shape and size at least approximately to a vertebra.

28. The apparatus as claimed in claim 25, characterized in that the support structure (1) corresponds in shape and size at least approximately to a bone part.

29. The apparatus as claimed in claim 25, characterized in that the container (14) is furnished with at least one pressure connection (17) for connection to a pressure source (19).

30. A support structure for culturing cells (2), wherein, for the formation of a cell layer in a cell culture chamber in the interior of the support structure (1), this is formed from a porous material and is furnished externally with a boundary layer (4) which is impermeable to cells.